REMARKS

The Office Action indicated that the subject matter of Claims 5-8 and 14-24 would be allowed if rewritten in independent form. Accordingly, it is believed that newly-drafted Claim 29 and its dependent Claims 30-31 represents the allowable subject matter referred to in Paragraph 7 on Page 4 of the Office Action.

The present invention addresses a problem inherent in conventional metal halide lamps that can require a significant high voltage pulse added by an igniter circuit in a driving circuit between a pair of electrodes contained in an arc tube. In this environment, high temperature and high pressure that occurs in an arc tube during a discharge over a life of the metal halide lamp can create heat fatigue to the structure of the arc tube. This issue is graphically disclosed in Figures 11B and 11C of our present drawings.

As can be appreciated, when a discharge arc tube breaks, the charged rare gas, mercury and metal halide gases escape and the arc discharge ceases so that the current value will drop to zero. The igniter portion of the drive circuit can detect that the lamp voltage has risen and will add a high voltage pulse to an applied sine wave voltage because this breakage event replicates the conditions at a start up operation of the lamp. The application of this high voltage pulse during the normal operation phase of the lamp will cause a breakdown in installation between the electrodes and the starting wire and subsequently can cause an arc discharge or an abnormal discharge across the electrode and the starting wire.

As can be appreciated, when the starting wire which is generally a narrow molybdenum wire, is subject to a high voltage, the starting wire can melt and the discharge distance can increase until the voltage necessary to continue this abnormal discharge can no longer be sustained.

During this time period, however, an increase in temperature has occurred and a possibility of cracking and breaking the outer tube can occur, besides the resultant damage to the ballast and other components of the circuit.

The present invention addresses these problems to prevent a potential secondary damage and possible safety hazards that can occur during an abnormal discharge.

Reference can be made to the specification, for example on Page 4, Lines 1-4 in defining the meaning of "abnormal discharge." Additionally, reference can be made to the specification, Page 6, Lines 17-21 to disclose support for the current-limiting unit, for limiting current on a current path during an abnormal discharge to a current value restricted within a range in which the operating start up voltage does not rise.

The Office Action maintained a rejection of independent Claims 1 and 10, as being completely anticipated by the *Iida et al* (U.S. Patent No. 4,520,294).

Specifically, the Office Action referred to an embodiment of Figure 10 and defined an equivalent circuit breaking/limiting unit as a thermo sensitive switch 17 connected to the proximity conductor 15. It should be noted that in this embodiment, the thermo sensitive switch 17 is in addition to the thermo sensitive switch 3 that is closed at room temperature and open at a high temperature when the lamp is on.

The proximity conductor 15 is connected at the same potential as electrode 2b and a counter electrode potential is applied to the other electrode 2a as noted in Column 6, starting at Line 64. If the potential is applied to the proximity conductor 15, after the turn on of the light-emitting tube, sodium ions in the light-emitting tube are attracted to the potential and leak out of the light-emitting tube 1, which can result in a deterioration of the performance of the discharge lamp.

Thus, the cited *Iida et al* embodiment, referred to in the rejection, addresses a problem of opening a proximity conductor by having a second thermo responsive switch 17 cut off a potential to the proximity conductor after the discharge lamp has been started. However, the Office Action erroneously refers to Column 8, Lines 14-22, which is directed to the embodiment of Figure 11 and the cited description is actually referring to a thermo sensitive switch 3 that is incorporated in the starting circuit 6, which in Figure 11 uses the reference numeral 18. See the discussion in Column 7, Lines 27-34.

As can be appreciated, the relied upon description of the circuit of Figure 11 in Column 8, Lines 14-22, is not referring to the separate thermo sensitive switch 17 and is not cutting off the current to the starting wire in the manner described in the embodiment of Figure 10.

The Office Action further referred to *Larson et al* (U.S. Patent No. 4,179,640) to purportedly supplement the deficiencies in the *Iida* reference of having an igniter wire 40 connected to one electrode via a resister 50 or a capacitor 52 as shown in Figures 6 and 8.

These circuit elements, however, are used to electrically isolate the starter metal member after a lamp is normally operating. They do not address the circumstances of an abnormal discharge or outer tube discharge as defined in our specification, that can simulate a start up condition where a high voltage can be applied with potentially disastrous effects between one electrode and the starter wire.

Thus, as set forth in Column 4, Lines 43-49, it is recognized in the *Larson et al* reference that a start-up pulse of 3,000 volts can be applied between the trigger or igniter wire and the adjacent electrode. More particularly, the *Larson et al* reference is directed to the use of an arc tube of a single crystal sapphire that can be impervious to the migration of sodium ions during normal lamp operation. However, if a polycrystalline alumina arc tube is utilized, migration of

sodium ions during the normal operation of a lamp can occur, and the igniter wire can be impacted. To remove this effect, a high impedance capacitor or a high impedance resister is connected in the series with the igniter wire, which is thereby capable of electrically isolating the igniter wire during normal lamp operation.

As an alternative embodiment shown in Figure 4, a heated bi-metallic switch can be used to open the igniter wire during normal lamp operation.

In each of these cases, however, the igniter wire is still operable upon receiving the start-up pulse.

The present invention addresses an issue of a breakdown, after the starting circuit is induced to create a high voltage starting pulse.

Thus, in summary, the *Larson et al* reference does not contribute any additional teaching than that set forth of using a bi-metallic thermal switch shown in Figure 10 of the *Iida* reference.

Certainly, the operation of a thermo sensitive switch that is normally ON, but after the start of the lamp and a resulting increase in temperature in the light-emitting tube can turn a thermally sensitive switch OFF for preventing ions from the light-emitting tube from being attracted to the proximity conductor, does not address the problems resolved by the present invention.

Under such circumstances, neither the *Iida* and the *Larsen et al* disclosure alone or in combination would resolve a problem if the light-emitting tube breaks during post-start operations and the temperature in the lamp decreases comparatively quickly, which would then cause a thermo sensitive switch 17 to be turned on, and then permits a conductivity of the starter wire to cause a problem with an abnormal discharge across the electrode and the starter wire.

The present invention directly recognizes this problem and offers a solution that cannot be achieved by any combination of the cited references.

It is respectfully submitted that these novel features have now been clarified and should be appreciated in interpreting the currently amended Claims 1 and 10 and the newly drafted Claim 32. Claim 32 utilizes 35 U.S.C. §112, sixth paragraph to define the function achieved by our present circuit disclosure.

In summary, neither of the references recognize nor address the problems of an abnormal discharge and the resulting safety and equipment failures that can occur. Equally important, they do not describe circuit elements to address this problem and resolve it, as set forth in our current claims. Accordingly, it is requested that the application be allowed.

If there are any questions, the undersigned attorney can be contacted at the listed phone number.

I hereby certify that this correspondence is being transmitted via facsimile to the USPTO at **571-273-8300** on June 22, 2006.

By: Sharon Farnus

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Signature

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Very truly yours,

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